Diagnosis and disease burden of MPS VII – a European survey

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Background

MPS VII (Sly disease) is an ultra-rare condition with very few published studies describing the disease and it's impacts. We believe this survey is the first to explore the patient experience through direct questioning of the parents/carers of individuals with MPS VII.

The study aims were to describe MPS VII diagnosis, disease impact and support needs in Europe.

Methods

- Subjects were identified through the MPS Society UK's contacts and the European MPS Network
- Local patient organisations supported the study by contacting and interviewing their MPS VII families
- Informed consent was obtained from all participants before they completed a specifically designed questionnaire
- Suitably translated questionnaires were provided for each respondent

Results

- Contacts in 25 European countries were asked if they were in contact with any individuals with a confirmed diagnosis of MPS VII
- A total of 18 individuals were identified, of which 13 consented to take part in the study (Table 1)

Table 1. Study participant numbers

Country	Number of individuals with MPS VII
Germany	2
Spain	3
The Netherlands	2
Turkey	6
TOTAL	13

Please note that results are presented for the 13 consented individuals, however, some questions on the questionnaire were not answered by some of the responders, where this is the case the number of responses (N) is given.

- Questionnaires were completed between 30th November 2017 and 31st March 2018
- Individuals with MPS VII ranged in age from 3 to 34 years (mean 17.1 years), two were siblings
- All questionnaires were completed by a parent or carer
- One quarter had taken part in an ERT trial (N=12). Two individuals had received a transplant (HSCT)

Diagnosis

- Children with non-immune hydrops fetalis (NIHF) were diagnosed with MPS VII between the ages of 0 to 6 years (mean 1.9 years, N=5)
- Presentation with NIHF led to testing and diagnosis of MPS VII in all but one of the children with NIHF
- Those without NIHF were diagnosed between the ages of 0 to 14 years (mean 5.3 years, N=7)

The earliest symptoms are shown in Table 2.

Table 2. Early symptoms before mean age of 2 years (N=8)

Symptoms	% individuals
Large head	62.5%
Sleep disturbance	75.0%
Recurrent respiratory infections	50.0%
Noisy breathing	37.5%
Unusual eating habits	37.5%
Hernias	87.5%
Hearing problems	37.5%
Snoring	37.5%

- Most individuals were seen by more than one healthcare professional before diagnosis (mean 4.6 professionals); the most frequently seen were a hospital paediatrician (88.9%), general practitioner (66.7%), ear, nose and throat specialist (44.4%) or geneticist (44.4%), (N=9)

The most common prior diagnoses and symptoms that led to a suspicion of an MPS disease are shown in Tables 3 and 4.

Table 3. Most common prior diagnoses (N=9)

Prior diagnosis	% individuals
Attention deficit hyperactivity disorder	22.2%
Autistic spectrum disorder	22.2%
Perthes disease	22.2%
Developmental delay	11.1%

Table 4. Symptoms leading to a suspicion of MPS (N=9)

Symptoms	% individuals
Enlarged liver and/or spleen	66.7%
Coarse facial features	55.6%
Thick hair/eyebrows	55.6%
Joint stiffness or pain	44.4%

Disease progression

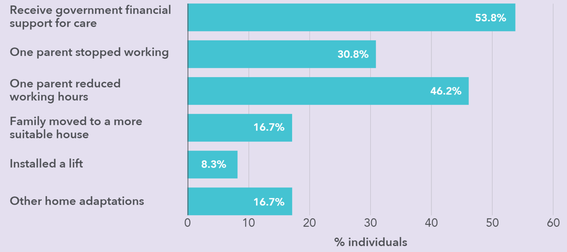
- Loss of walking ability occurred at a mean age of 15.5 years, but some were still able to walk unaided in their 30's
- Most individuals speech was either normal or delayed, 15.4% had deterioration (aged in range 21–35 years)
- Delayed learning was common (69.2%) and 15.4% had deterioration (aged in range 16–35 years)
- Behavioural issues were present in 46.2%
- The mean age of children starting at a specialist school was 7.6 years (N=12)

Burden of illness

Caring for someone with MPS VII

The impacts on families' income and housing are illustrated in Figure 1.

Figure 1. Impact on family income and housing



Medical needs

- Eighty-five percent of individuals had undergone at least one surgery (N=11)
- Supportive therapy is mostly physiotherapy, received by 58.3% (N=12)
- Individuals attend multiple appointments in a typical year (mean 12.7)
- Other than surgery or transplants, most hospitalisations were for respiratory issues with individuals staying in hospital for up to 10 days, but spending no time in intensive care

Learning and behavioural needs

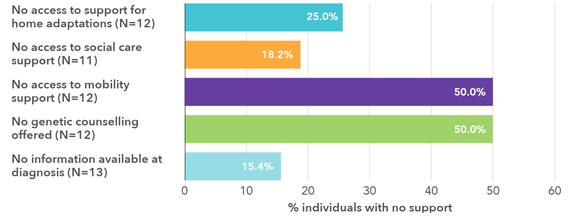
- The most commonly provided school assistance was a specialist teacher, received by over half the individuals at their first and second educational establishments
- Forty percent of individuals received one to one adult support at their second school (N=10)
- Professional support at school included physiotherapy, speech and language, educational psychologists and special educational needs co-ordinators

Support needs identified

Key support needs identified are shown in Figure 2. In addition, children may need help to socialise at school and families would like more information on the disease, current treatment and future therapies.

- Learning and behaviour support is generally available where needed

Figure 2. Support needs



Conclusions

- For children that do not present with NIHF, diagnosis can take several years
- The symptoms most likely to raise suspicion of MPS typically do not appear until age 3 or older
- Parents/carers were not always given adequate information at diagnosis and medical professionals may not be aware of the information that is available
- Greater access to genetic counselling is needed
- Issues with behaviour and mobility are common and difficult for parents/carers to manage
- Access to social support for mobility, care and home adaptations is not available to all
- Families need more information about the disease, currently available treatment and future therapies

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